

REMARKS

Claims 1-40 are all the claims pending in this application. Claims 1, 2, 12-20, 22-29, 39 and 40 are withdrawn. Claims 3-11, 21 and 30-38 have been examined.

The foregoing amendments to Claim 3 relating to the rubber members are intended to clarify the claim. Support for the amendments is found in the specification on page 11, lines 1 to 5; Figs. 1 to 15 and the Examples. The Examiner is also directed to original Claim 37.

Halasa (EP 985,554) discloses a polydiene rubber coupled with a Group IVa metal such as tin, lead, germanium or silicon and exemplifies polybutadiene as the polydiene rubber. However, Halasa neither teaches nor suggests the requirement of a vinyl linkage of 25% or more in conjugated diene units. The content of a vinyl linkage (1,2 linkage content) in case of isoprene-butadiene rubber (IBR) used in Examples 1 to 9 of Halasa and polybutadiene rubber used in Example 18 is remarkably low such as 7 to 8%.

In this respect, Applicants respectfully refer the Examiner to Tables 8 and 9 of the present specification in which evaluation-test results of the rubber composition (r2) used in Examples are shown.

In Table 8, the rubber composition (r2) uses polybutadiene, with the content of a vinyl linkage in the conjugated diene units being 2.5% (Comp. Ex 9), 30% (Ex. 39), 35% (Ex. 40), 40% (Ex. 41), and 50% (Ex. 42), and no chain end modifier. In Table 9 the rubber composition (r2) uses polystyrene-butadiene, with the content of a vinyl linkage in the conjugated diene units being 18% (Comp. Ex 10), 55% (Ex. 45) and 53% (Ex. 46), and no chain end modifier.

As shown in Table 8, a pneumatic tire according to the present invention using the rubber composition (r2), in which polybutadiene was employed in the side wall reinforcing layer, is excellent in run flat durability (index) with increase of the content of a vinyl linkage. In particular, the use of polybutadiene with the content of a vinyl linkage of 40% or more brings about a conspicuously excellent run flat durability (index).

Likewise, Table 9 shows that a pneumatic tire using the rubber composition (r2), in which polystyrene-butadiene was employed in the side reinforcing layer and the bead filler, exhibits a particularly superior run flat durability (index), when Examples using polystyrene-butadiene with the content of vinyl linkage of 55% and 53% are

compared with Comparative Example using the same with the content of a vinyl linkage of 18%.

There is another index for supporting the above-mentioned characteristic feature of the present invention, specifically, the ratio of minimum value of dynamic storage modulus at 200 to 250°C to dynamic storage modulus at 50°C (index). As shown in Tables 8 and 9, this leads to an index of 100 or higher with the increase of the vinyl linkage. On the contrary, the vinyl linkage of 25% or less results in a lowered index.

During a "run-flat-running" in which a tire is driven under such a condition that the pressure at the inside thereof is lowered by a puncture of the tire, the temperature of the tire is occasionally elevated to 200°C or higher. At such a high temperature, the breaking of cross-linked portions formed by vulcanization and the breaking of polymer chain occur in the rubber component in the above rubber composition and, as a result, the modulus of elasticity of the rubber composition decreases and the function of supporting load becomes less effective, resulting in increased deformation of the tire. The increase in the deformation causes further heat generation, and the fracture limit of the side reinforcing layer decreases. As a result, the tire can be damaged in a relatively short period of time.

In contrast, in the present invention, the use of a polymer with a high content of a vinyl linkage will cause polymerization, cross-linking and curing of the rubber reinforcing layer, when the layer is exposed to a higher temperature during run-flat-running, thus making it possible to support loading for rather long periods of time in the state of run-flat-running.

According to the present invention, the above-stated performances can greatly be obtained by the use of a vinyl linkage of 25% or more.

The above-described unexpected effect as caused by the vinyl linkage is not disclosed or suggested by Halasa (EP 985,554).

The object of Hattori (USP 5,432,232) is to obtain a rubber composition for use in a tire tread which satisfies wet skid resistance, ice skid resistance and dry gripping property, in addition to wear resistance and fracture properties.

The Examiner notes that Hattori discloses the rubber composition usable for side walls. However, the rubber composition of Hattori is actually applied to the tread portion at the time of usual running, while the rubber composition of the present invention, as explained above, is applicable to members in a specified position under severe conditions, such as the side reinforcing layer arranged at an inner side of the tire

and adjacent to the carcass layer of side wall portions. Hattori entirely fails to teach or suggest this aspect of the present invention.

Further, Hattori does not in the least disclose or suggest any function to suppress deterioration of the elastic modulus at very high temperatures during run-flat running, nor any function that the elastic modulus remarkably increases at extremely high temperatures though the elastic modulus is low at a low temperature, such functions being required for the side reinforcing layer in the present invention.

Finally, the remaining references cited and applied by the Examiner fail to supply the deficiencies of Halasa and Hattori as described above.

In view of the preceding amendments and remarks, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephonic interview, he is kindly requested to contact the undersigned attorney at the local telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.111
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A Petition for Extension of Time accompanies this document. The USPTO is directed and authorized to charge all required fees (except the Issue/Publication Fees) to our Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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